

AMENDMENTS TO THE DRAWINGS

The attached sheets of drawings include additional Figures 33 and 34.

Attachments: Replacement sheets

REMARKS

The following rejections and objections are pending as of this Office Action:

The drawings are objected to under 37 C.F.R. §1.83(a) as not showing every feature of the invention specified in the claims, and as not including flow charts for computer software.

Claims 1-20 are rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement.

Claims 1-20 are rejected under 35 U.S.C. §101 as directed towards non-statutory subject matter.

Examiner's Reminder to the Applicant Regarding Applicant's Duty to Disclose

In response to Examiner's reminder to Applicant of Applicant's duty to disclose under 37 C.F.R. §1.56, Applicant respectfully notes that Applicant has disclosed all references known to be material. Applicant further notes that the named inventor is now deceased.

Objection to Drawings under 37 C.F.R. §1.83(a)

The Examiner objected to the drawings under 37 C.F.R. 1.83(a) as not showing every feature of the invention specified in the claims. In response, the Applicant has included a new drawing sheet containing Figure 33. This flow chart shows every claimed feature, and adds no new subject matter. *See* figures and Claim 1 as originally submitted.

The Examiner additionally objected that the claimed invention involved “(computer) processing,” and thus required a flow chart to demonstrate the software. Applicant respectfully disagrees with the Examiner's characterization that the claims necessarily involve “(computer) processing.” Nothing in the specification or the claims limits the “processing” step to computers. The step of “processing said limited view measurements *u* to

obtain Fourier transformed measurements \tilde{u} ” is defined in the specification on page 17, lines 23-25, as governed by a simple mathematical relationship. Thus, one skilled in the art could “process” u to obtain \tilde{u} with or without a computer or any specific computer software. Despite this disagreement, Applicant has included a new flow chart of the “processing” step as Figure 34. This figure adds no new subject matter. See page 17, lines 23-25 of the specification.

In light of the additional figures and arguments made herein, Applicant respectfully requests that the objections to the drawings under 37 C.F.R. §1.83(a) be withdrawn.

Rejection of Claims 1-20 under 35 U.S.C. §112, first paragraph

The Examiner rejected Claims 1-20 under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. Specifically, the Examiner objects that the specification does not disclose any “specific or even general processing or computing means.” Applicant respectfully traverses this objection. The Examiner states that the claim limitation “processing said limited view measurements u to obtain Fourier transformed measurements \tilde{u} ” lacks enabling support. However, on page 17 lines 23-25, the specification states that “[t]he processed data $\tilde{u}(\kappa, \omega)$ is the double Fourier transformed u ” as defined by Equation (7). Equation (7) provides an enabling description allowing one skilled in the art to process u to obtain \tilde{u} . Fourier transforms and implementations of such transforms are well known to those skilled in the art. The enablement requirement is met where the specification “enables one skilled in the art to make and use the invention.” See *Singh v. Brake*, 317 F.3d 1334, 1345 (Fed. Cir. 2003). A person skilled in the art would know how to implement Equation (7) to obtain \tilde{u} from u , and therefore the specification is enabling.

In light of the arguments made herein, Applicant respectfully requests that the rejection under 35 U.S.C. §112, first paragraph be withdrawn.

Rejection of Claims 1-20 under §101

The Examiner rejected Claims 1-20 under 35 U.S.C. §101 as directed towards non-statutory subject matter.

As a preliminary matter, Applicant respectfully notes that the current standard for determining statutory subject-matter is that the claimed machine or method must produce a “useful, concrete, and tangible result.” See *AT&T Corp. v. Excel Communications, Inc.*, 172 F.3d 1352, 1357 (Fed. Cir. 1999). The Examiner stated that “the claimed process must be limited to a practical application of the abstract idea or mathematical algorithm in the technological arts.” The Applicant respectfully notes that the Board of Patent Appeals and Interferences has rejected the so-called “technological arts” test. See *Ex parte Lundgren*, Appeal No. 2003-2088 (BPAI 2005). Further, the Examiner argues that “[t]here is no physical transformation of the physical measurements....” The Applicant respectfully notes that the Federal Circuit has explained that physical transformation “is not an invariable requirement, but merely one example of how a mathematical algorithm may bring about a useful application.” *AT&T Corp.*, 172 F.3d at 1358. Indeed, physical transformation is just one indication that “the mathematical algorithm included within the process was applied to produce a number which had specific meaning - a useful, concrete, tangible result - not a mathematical abstraction.” See *id.* at 1359 (citing in *Arrhythmia Research Tech. v. Corazonix*, 958 F.2d 1053, 1060 (Fed. Cir. 1992)).

Claims 1 and 16 have been amended to include an additional step of “presenting said reconstructive wave attributes as an image.” Applicant respectfully asserts that amended Claims 1 and 16 claim a method that produces a “useful, concrete, and tangible result.” See *AT&T Corp.*, 172 F.3d at 1357. In *Arrhythmia*, the Federal Circuit noted that a claim preamble defining “method for analyzing electrocardiograph signals to determine the presence or absence of a predetermined level of high-frequency energy in the late QRS

signal” was not to be ignored in determining whether the subject matter as a whole was statutory. *See Arrhythmia*, 958 F.2d at 1059. The court then examined the claim as a whole and concluded that the claim was statutory subject matter because “[t]he resultant output is not an abstract number, but is a signal related to the patient's heart activity.” *See id.* Similarly, Claims 1 and 16 provide a concrete, tangible process of taking in “limited view measurements” and producing the concrete, tangible product of images of “reconstructed complex wave attributes.”

As to the usefulness of the output of the method, the Federal Circuit has suggested looking to the specification for proof of usefulness, and Applicant’s specification is replete with pertinent references. *See id.* On page 2 lines 7-8 of the specification, Applicant explains: “What makes these applications so powerful is that changes in wave propagation characteristics are diagnostics for more fundamental material properties.” Applicant further explains in lines 21-23 the value of imaging individual properties separately: “Having access to each of these properties separately, rather than as a composite response, better serves to characterize the material of interest, such as distinguishing plastic from metal and wood, etc.” Applicant continues on page 3 and 4 to explain that “[i]t is currently possible to separate fundamental properties from wave-based measurements” only for a few very specific geometries, but “[w]hat is needed is a methodology that will allow the isolation of individual material properties from limited view measurements.” Thus, as the specification shows, images of reconstructed complex wave attributes—the output of the claimed process—are not “random number[s],” but rather represent a “useful, concrete, and tangible result,” related to individual material properties and as such constitute statutory subject matter. *See Arrhythmia*, 958 F.2d at 1059, *AT&T Corp.*, 172 F.3d at 1357.

In light of the amendments and arguments made herein, Applicant respectfully requests that the rejection under 35 U.S.C. §101 be withdrawn.

CONCLUSIONS

In light of the Applicant's argument, applicant respectfully requests withdrawal of the outstanding rejections and allowance of the pending claims. If any issues remain outstanding, please contact the undersigned for resolution of the same.

Our check in the amount of \$510.00 is enclosed to cover the fee for extending the time to respond by six (6) months. Applicant believes that no other fees are associated with the filing of this response. However, if Applicant is in error and any fees are owing, the Commissioner may charge Deposit Account No. 06-2375, under Order No. P02805US1/10307238, from which the undersigned is authorized to draw.

Respectfully submitted,

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